

Optimizing Outcomes in Bariatric Surgery

Outpatient Laparoscopic Gastric Bypass

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Background: Roux-en-Y gastric bypass (RYGB) is an effective treatment of severe obesity and one of the fastest growing surgical procedures in the United States.

Methods: A single institution prospective database of patients undergoing outpatient laparoscopic (lap) RYGB over a 3-year period was reviewed. Study end points included hospital discharge within 23 hours, 30-day hospital readmission rate, early (<30 day) and late complication rates, and 30-day perioperative mortality. Variables assessed included surgeon experience, patient demographics, comorbidities, operative time, Roux limb pathway, intraoperative steroid bolus, and use of dexmedetomidine.

Results: Two thousand consecutive patients undergoing outpatient lap RYGB were identified, and 84% (n = 1669) were discharged within 23 hours. Of these, 1.7% (n = 34) were readmitted within 30 days. The overall early and late complication rates were 1.9% (n = 38) and 4.3% (n = 86), respectively. The 30-day mortality rate was 0.1% (n = 2), and neither patient was discharged before death. Univariate analysis demonstrated surgeon experience (<50 cases), age (<56 years), body mass index (<60 kg/m²), weight (400 lbs), comorbidities (<5), and intraoperative steroid bolus as predictive of successful outpatient discharge. Multivariate analysis revealed surgeon experience, comorbidities, body mass index, and steroid bolus as predictive variables.

Conclusions: These data suggest that outpatient lap RYGB can be performed with acceptable perioperative complication rates, hospital readmission, and mortality rates. Surgeon experience, careful patient selection, and the use of intraoperative steroid bolus predicted optimal patient outcomes.

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Roux-en-Y gastric bypass (RYGB) is the most common surgical procedure in the United States for the treatment of morbid obesity.¹ In the 1990s, there was considerable

debate regarding the benefits of laparoscopic over open procedures. In a review of 5235 patients who underwent either laparoscopic (lap) or open RYGB between 1994 and 2002, Nguyen and others showed a significant decrease in the incidence of iatrogenic splenectomy, wound infection, incisional hernias, and mortality for the laparoscopic approach.² However, there was an increased incidence of bowel obstruction as a result of internal hernias, stomal stenosis, and gastrointestinal tract hemorrhage with the lap-RYGB. Since 2002, there have been reports of technical and perioperative improvements in care that have helped to reduce these complications.^{3–5} A change in the gastrojejunal anastomotic size from 21 mm to 25 mm led to a decrease in the incidence of stomal stenosis from 26.8% to 8.8%.⁶ A change in the roux limb from a retrocolic approach to an antecolic approach was shown to decrease the incidence of internal hernias from 4.5% to 0.43%.⁷ The timing of thrombotic prophylaxis has helped to decrease the incidence of gastrointestinal hemorrhage.⁸ McGrath reported on the evolutionary changes of the lap RYGB and outlined the development of a safer laparoscopic procedure.⁹ As improvements in technique are identified and as Centers of Excellence are developed, programs can adopt these strategies into a best practice model to achieve the lowest possible rates of complications and to decrease hospital length of stay.

The purpose of this article is to report on a large, single institutional experience of patients undergoing a lap RYGB with sequential incorporation of operative and postoperative modifications to achieve the lowest possible rate of pain, nausea, and postoperative complications. The net result of an ideal minimally invasive procedure is a patient who is ambulatory, tolerating liquids without nausea, and capable of hospital discharge. In this study, the measure of an optimal postoperative course was measured by the number of patients capable of hospital discharge within 24 hours.

METHODS

This study was performed with approval of the Baylor University Medical Center Institutional Review Board. The study group included consecutive patients from October 2001 through December 2004. Patients were selected for surgery based on criteria as proposed by the National Institute of Health consensus development panel report of 1991, including patients with a body mass index (BMI) >35 kg/m² with

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comorbidity or a BMI >40 kg/m² with or without comorbidities. Study exclusion criteria were revision and/or open RYGB procedures. The preoperative workup included routine chemistry, chest x-ray, electrocardiogram, and either an upper gastrointestinal series or esophagogastroduodenoscopy was obtained in all patients. An echocardiogram was obtained in patients with known cardiac disease. Pulmonary function tests or sleep apnea tests were not generally performed.

The operative technique included several cohorts for comparison based on either surgeon preference or the sequential adoption of perceived improvements. The basic procedure included a transected stomach using staple line reinforcements, creation of a 30-mL pouch, a standardized Roux limb length of 100 cm for BMI <50 kg/m² and 150 cm for BMI >50 kg/m², a circular stapled gastrojejunostomy with anterior suture reinforcement, and a linear stapled jejunojejunostomy for creation of the roux limb with stapled closure of the resultant jejunostomy. The anastomosis was tested intraoperatively using blue dye under pressure with distal occlusion. Some of the variable operative techniques included cohorts of patients with either 21- or 25-mm circular stapled gastrojejunostomy, and either antecolic or retrocolic placement of the roux limb. With a retrocolic Roux limb, the transverse mesocolic and roux limb mesenteric defects were closed in an interrupted or running fashion with nonabsorbable suture. In addition, there was a transitional experience with groups of patients who received intraoperative steroids to reduce the postoperative nausea and the physiological stress of the surgery. Finally, there was a group of patients who received an infusion of a centrally acting alpha 2 adrenergic agonist (dexmedetomidine) to reduce postoperative pain requirements and avoid early respiratory suppression. Otherwise, the postoperative care was standardized to include a patient-controlled analgesic pump with morphine sulfate, a COX-2 inhibitor, and a sequential progression from ice chips to a low-carbohydrate clear liquid diet.

The study endpoints included hospital discharge within 23 hours, 30-day hospital readmission rates, early (<30 day) and late complication rates, and 30-day mortality rates. The variables that were assessed included surgeon experience, patient demographics, comorbidities, operative time, roux limb pathway, intraoperative steroid bolus, and the use of dexmedetomidine.

Statistical univariate analysis was performed using chi-squared testing with statistical significance at the 95% level, whereas multivariate analysis was performed using logistic regression analysis.

RESULTS

Two thousand consecutive patients were included in this analysis over a 3-year period. Patient characteristics revealed an average BMI of 49 kg/m² with a range from 35 to 77 kg/m². The female to male ratio was 7:1, and the mean age was 42 years. Patients presented with an average of 3.5 (range, 0–11) comorbid conditions, including: degenerative joint disease (62%), gastroesophageal reflux (55%), hypertension (50%), urinary stress incontinence (40%), sleep apnea (31%), and/or diabetes mellitus (25%) (Table 1).

TABLE 1. Patient Characteristics (n = 2000)

Patient Characteristics	Variable
Demographics	
Mean age (SE)	41.5 (range 14–67)
Sex (F:M)	7:1
Mean body mass index (kg/m ²)	49.3 (range 35–100)
Body mass index ≥ 60 ; no. (%)	23 (11.5%)
Comorbidities (%)	
Congestive heart failure	1.6%
Diabetes	24.8%
Degenerative joint disease	61.8%
Gastroesophageal reflux disease	55.2%
Hypertension	49.5%
Sleep apnea	31.0%
Urinary stress incontinence	40.1%
No. of comorbidities ≥ 4	29.4%
SE, standard error.	

The analysis of operative time revealed minimal variation among the 4 surgeons that comprise this study group, although surgeons with the most experience (>200 cases) did tend to have shorter operative times (54 minutes vs 115 minutes, $P < 0.05$). The most common types of early complications included gastrojejunal anastomotic strictures (n = 16, 0.8%), gastrointestinal bleeding (n = 6, 0.3%), gastrojejunal anastomotic leaks (n = 4, 0.2%) and pulmonary embolism (n = 2, 0.1%). In this series, there were 4 patients (0.5%) with gastrojejunal anastomotic leaks requiring reoperation. The most common late complications included internal hernias (n = 50, 2.5%), gastrojejunal stricture requiring endoscopic dilatation (n = 26, 1.3%) and gastrogastic fistula (n = 4, 0.2%). The overall early and late complication was 6.2% (n = 124). Median follow up was 18 months (Table 2).

Prediction of specific complications by univariate analysis was performed for anastomotic leaks, internal hernias, and gastrojejunal strictures. Based on patient age, BMI, number of comorbidities, intraoperative steroids, pathway of roux limb, or physician, there was no predictive factor for gastrojejunal leaks or gastric remnant leaks. Analysis of these factors for prediction of internal hernias revealed a significantly higher risk with the retrocolic roux limb pathway

TABLE 2. Incidence of Postoperative Complications

	Complication <30 D (n = 38)	Complication >30 D (n = 86)
Gastrojejunostomy stricture	0.8%	1.3%
Internal hernia	0.6%	2.5%
Gastrojejunostomy hematoma	0.2%	0
Gastrojejunostomy leak	0.2%	0
Pulmonary embolism	0.1%	0.05%
Jejunoejejunostomy hematoma	0.05%	0
Jejunoejejunostomy leak	0.05%	0
Gastrogastic fistula	0	0.2%
Marginal ulcer	0	0.2%

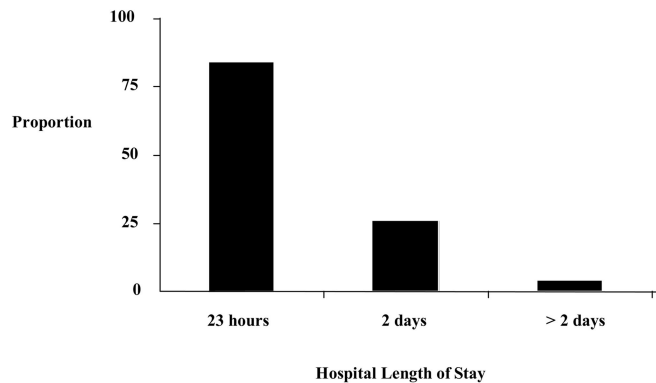


FIGURE 1. Hospital length of stay, n = 2000.

TABLE 3. Univariate Analysis for Predictors of 23-H Discharge

Variable	P Value
Age (<60 yr)	0.048
Sex (male)	0.018
Body mass index (<60 kg/m ²)	0.003
Weight (<400 lbs)	0.043
Steroid bolus	0.03
No. of comorbidities	0.0004
Learning curve	<0.0001

(8.3% vs 0.8%, $P < 0.05$). For gastrojejunal stricture, a 21-mm EEA anastomosis had a significantly higher risk compared with a 25-mm EEA anastomosis (7.5% vs 2%, $P < 0.05$).

There were 2 mortalities in this population, including one patient with a gastrojejunal anastomotic hemorrhage followed by cardiac failure and one patient with unexplained postoperative multisystem organ failure.

Hospital length of stay was analyzed for the entire patient population and revealed an average length of stay of 1.8 days. Of the 2000 patients, 84% (1669) were discharged within 23 hours based on achievement of physical and laboratory criteria (Fig. 1). Of the patients who were discharged as an outpatient, 34 (1.7%) were readmitted within 30 days. No significant difference was noted in the 30-day readmissions rates comparing those patients discharged within 24

hours and those discharged beyond 24 hours (1.7% vs 1.4%, $P =$ not significant). Univariate analysis demonstrated surgeon experience (>50 cases), age (<56 years), BMI <60 kg/m², weight <400 lbs, comorbidities <4, and intraoperative steroid bolus as predictive of successful outpatient discharge (Table 3). Multivariate analysis revealed surgeon experience, comorbidities, BMI, and steroid bolus as predictive variables (Table 4) with a trend favoring males. Within this patient population (n = 1605), successful 23-hour outpatient discharge was achieved in 93% (n = 1492). An adjusted multivariate analysis for the first 50 cases of a surgeon's experience revealed BMI, intraoperative steroid bolus, and the number of associated medical comorbidities as predictive of successful 23-hour outpatient discharge (Table 4).

DISCUSSION

The American Society for Bariatric Surgery estimated that there were 140,000 weight loss procedures performed in the United States in 2004. In comparison, there were approximately 450,000 cholecystectomy procedures performed annually.¹⁰ Consequently, weight loss surgery has become one of the most common general surgical procedures. The RYGB procedure has generally been considered the gold standard based on the availability of long-term results that achieve an approximate 70% excess body weight loss over 7 to 10 years. The correction of comorbid conditions has been reported for diabetes mellitus (83%), hypertension (69%), gastric reflux (100%), urinary stress incontinence, and degenerative joint disease.^{11–14} Flum and others have shown a significant improvement in survival for a group of patients treated with surgery compared with conventional treatment.¹⁵ The cost analysis shows that the recovery of procedure cost is achieved in 12 months.¹⁶ When one considers the improvements in life expectancy, resolution of severe chronic disease, improvement in quality of life, and reduction in risk of cancer, there is hardly a procedure or medication in the history of medicine that can equal the RYGB procedure.

The challenge for the surgical community is to offer the RYGB procedure with the lowest possible rate of complications. With the demand for safeguards and standardization, it is appropriate to consider all approaches and technical modifications that have shown statistical improvement leading to less nausea, less sedation, improved pain control, improved mobility, earlier oral intake, and lower rates of complications.

TABLE 4. Multivariate Analysis for Predictors of 23-H Discharge, Unadjusted and Adjusted for Surgeon Experience (>50 cases)

Logistic Regression	Unadjusted			Adjusted		
	OR	RR (95% CI)	P	OR	RR (95% CI)	P
Sex	1.461	1.28 (1.04–1.54)	0.019*	1.371	1.23 (0.99–1.50)	0.065
Body mass index (kg/m ²)	1.647	1.34 (1.11–1.57)	0.003*	1.683	1.35 (1.11–1.59)	0.003*
Learning curve	2.444	1.64 (1.42–1.85)	<0.0001*	1.1	1.04 (0.95–1.19)	0.08
>4 comorbidities	1.924	1.53 (1.32–1.75)	<0.0001*	1.680	1.42 (1.19–1.65)	0.0001*
Steroid bolus	1.543	1.32 (1.15–1.49)	0.0002	1.288	1.18 (1.01–1.36)	0.038*

*The reference group for logistic regression analysis.

OR, odds ratio; RR, relative risk; CI, confidence interval.

Ideally, all surgeons could adopt a best practice approach and perform the surgery in the same way.

The evolution of laparoscopic gastric bypass has been reported by other authors, including advancements in laparoscopic equipment and operative technique.³⁻⁵ Specific comparisons of the type of gastrojejunostomy have been reported with variable results.¹⁷ Murr described the technical steps for a transabdominal loading of the circular stapler anvil in 100 patients with no complications.¹⁸ Gonzalez compared 3 techniques for gastrojejunostomy and found that a hand-sewn anastomosis reduced operating room supply costs.¹⁹ In some cases, the drive to avoid expensive stapling equipment is driven by the need to keep hospital costs down. Angus et al showed that hospital reimbursement based on a per diem basis is often less than the actual costs of equipment.²⁰ There is some data to suggest that the stapled closure technique is associated with a lower complication rate.²¹ From a cost savings perspective, it is far more important to keep the rate of complications as low as possible to avoid the significant costs associated with an anastomotic leak or other complications. It is also important to standardize an approach that is reproducible by practicing surgeons. The specific technical improvements for the laparoscopic gastric bypass procedure involve steps to reduce the risk of leakage, bleeding, postoperative pain, and nausea. Prior published and presented data have shown a decreased leakage rate using staple line reinforcement strips.²² Prior presentations have shown that a retrocolic approach is associated with a significant decrease in transverse mesocolic hernias.⁷ Dexmedetomidine has shown a significant decrease in the use of narcotics and respiratory suppression.²³ The use of intraoperative steroids has long been used in the field of otolaryngology to decrease postoperative nausea.²⁴ Additional studies have shown that the steroids also decrease the excess inflammatory cytokine release that can accompany surgery.²⁵ There has not been a reported increased risk of infection when used for other indications. A recent poster presentation recognized the decreased use of narcotics and improved outpatient discharges in patients who had placement of a catheter to deliver local anesthetic agents.²⁶

The results of this study showed that the incidence of gastrojejunal strictures was significantly lower with a 25-mm versus a 21-mm EEA anastomosis. In addition, the incidence of internal hernias was significantly lower with an antecolic roux limb compared with a retrocolic position. Based on incorporation of a protocol-driven care path, this study also found that this procedure could be performed as an outpatient procedure, allowing 84% of the patients to be discharged at 23 hours, with a 30-day readmission rate of 1.7%. This achievement required the adoption of techniques that kept postoperative nausea to a minimum, decreased postoperative pain and narcotic requirements to avoid respiratory suppression, sedation, and ileus. This care path allowed patients to tolerate liquids and initiate early ambulation such that inpatient care was not necessary. The key elements that are assessed on the morning after surgery are the clinical evidence that the patient is tolerating liquids, the vital signs of pulse rate and respiratory rate, and the laboratory indicators

of serial hematocrits. If any of these parameters are abnormal, an algorithm that includes a possible upper gastrointestinal series, a computed tomography scan, and additional observation are initiated.

The results of this large, single-center study suggest that the rate of early complications can be reduced to a low level. Livingston reported on the in-hospital complication rate using the National Hospital Discharge Survey database maintained by the Centers for Disease Control and Prevention. This nationally representative data suggests that there remains a 10% complication rate with an average hospital stay of almost 7 days.²⁷ This highlights the extreme variability of programs across the country who either continue to propose an open procedure or who fail to critically appraise every aspect of their practice and clinical care pathways to maximally reduce pain, nausea, narcotic requirements, and complications.

Carrasquilla reported on 1000 consecutive patients undergoing an antecolic antegastric lap RYGB with a total stapled total intraabdominal approach with a reported leak rate of 0.1%. This approach is virtually identical to the one used in this study.²⁸

Specific independent predictors of outpatient discharge were found to include surgeon experience >50 cases, BMI <60 kg/m², and use of intraoperative steroids. In this group of patients, the hospital discharge rate was greater than 90%. As other programs begin to initiate this strategy, it is useful to begin with patients who have a lower BMI. In addition, the experience should not begin until the physicians have incorporated features of a best practice philosophy through the use of specific preoperative medications and postoperative care paths that minimize the entire range of postoperative complications and side effects.

It is expected that there will be further refinements and improvements to the technique of laparoscopic gastric bypass procedure; however, we demonstrate in the current study that lap RYGB can be performed on a 23-hour outpatient basis in a safe and reproducible manner.

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Discussions

DR. HENRY BUCHWALD (MINNEAPOLIS, MINNESOTA): I don't know whether to congratulate you on a magnificent surgical feat or to condemn your study for endangering patients. Certainly, discharging 84% of your patients, for a total of 1669 patients in less than 24 hours, after major bariatric surgery in a difficult patient population, represents a surgical landmark. Also, your operative mortality is to be

congratulated —0.1% is far lower than the national average in the best of hands (0.5%).

My hesitancy in heaping praise upon you and this accomplishment is based on my fear that a national effort to discharge bariatric surgery patients in less than 24 hours will not result in the same laudable outcome. I believe we all need to work to reduce hospital and insurance costs, but not at the expense of patient welfare.

Thus my 4 questions: (1) Do you advocate adaptation of your less than 24 hour discharge by all bariatric surgeons? (2) If not, what is your national message? (3) How did you preoperatively condition your patients to accept same-day discharge after major surgery? And finally, did you by a questionnaire ascertain the satisfaction rate of your patients after this program of early discharge?

Thank you. I enjoyed your paper. In the final analysis I do sincerely congratulate you.

DR. TODD M. MCCARTY (DALLAS, TEXAS): Thank you, Dr. Buchwald. I appreciate your comments and your condemnation. I take it as a compliment.

The issue of training of the surgeons and the potential poor outcome of implementing an outpatient program when you are inexperienced is a very valid concern. In fact, we held this project and had planned to submit this to other meetings at 500 patients, but that very concern worried us.

On the other hand, I don't think that discharging patients on postoperative day 1 following a lap gastric bypass is inherently unusual across the United States. And as I talk to surgeons who are experienced and do this operation, I would bet at least 50% of their patients are going home postoperative day number 1, or they readily admit that they could send the patients home but they are a little bit unsure and the patients want to stay.

So I do think it is reproducible. I do think it is teachable. We have surgeons who come in on a routine basis and learn the components that are necessary to optimize patient outcomes. I think it is like credentialing for any procedure, you never really know how a patient is going to do until you turn them loose. But on the other hand, we require that you do at least 50 cases, 50 laparoscopic gastric bypass cases, before we would even be willing to entertain training for the outpatient approach.

So I don't have a solid answer for that and I think it is a very valid concern. But on the other hand, it does optimize patient care, the patient demand for it is growing, and I do think it will spread across the United States.

With regards to educating the patients, that is a key component, that is managing patient expectations. And as the number of patients grow and we have a very active after-care support group and online interaction with patients, they learn that other patients have gone through this, and that is just their expectation, to go home postoperative day number 1.

But early in the experience it was a little bit more difficult, especially with women with young children, who candidly wanted a 3- or 4-day break in the hospital. But as they have interacted with the postoperative patients and listened to stories, their expectation is to go home the next day.

We also take advantage of the fact that we don't have a bariatric floor, we have a general surgery floor in which trauma patients, general surgery patients, and bariatric patients interact. And they don't really want to be around some of the trauma patients if they don't have to be. And postoperative day number 1, if they can do the same thing at home that they are doing in the hospital, they actually turn out to be pretty motivated to go home. There are probably many components that have helped with that, but managing expectations is important.

We have not done a questionnaire for patient satisfaction. I can tell you that in the beginning it was a little bit more difficult to get the patients to accept going home that first day. Now, 2000 patients into it with the expectations appropriately managed, it is hard to keep most patients in the hospital. And my experience rounding the next morning is most of them are dressed and ready to go home. So I would expect that if we did a questionnaire that the patients would reply favorably.

DR. JOHN M. KELLUM, JR. (RICHMOND, VIRGINIA): I also enjoyed your paper, and I congratulate you on your low mortality rate. I, like Dr. Buchwald, worry about extrapolating this experience to other bariatric surgical centers, since insurance companies all over the country are taking a very jaundiced eye about covering this operation. I have 3 questions that I would like to pose.

We have done over 4000 of these operations, with a thousand of those being laparoscopic. Many of our patients come from several hundred miles away. Do you really think it is safe to send a patient home over 100 miles away 23 hours after doing a laparoscopic gastric bypass?

Also, you said there was resident participation. What exactly is the resident participation? Do you have laparoscopic fellows as well? How are they involved?

Finally, as far as patient satisfaction, I am sure that your hospital administrators are happy and that the HMOs are happy, but what is the hard evidence that the patients are happy? Will they, like the new mothers who successfully lobbied for legislation so they would not be discharged immediately after childbirth, organize against this policy?

DR. TODD M. McCARTY (DALLAS, TEXAS): Excellent question. As I said, we don't have a questionnaire about patient satisfaction. Indirectly I can tell you from patient demand and interacting with them that I think they are very satisfied with the outcomes, and certainly refer family and friends. And I think that at least indirectly suggests that they are satisfied.

With regards to operating on patients from more than 100 miles away, we really don't like doing that. It is not with regard to the outpatient approach, because we have a solid feel when they go home whether they going to have a problem or not, but, on the other hand, if they are four or five hundred miles away and they call with abdominal pain it always makes me very, very nervous. So our usual approach is to find a bariatric surgeon closer to them and have them obtain their surgery through that particular program. There are, however, some patients that have their mind set that they want the surgery done, and we will do it. We prefer that the patient stay in the general geographic area, within 10 or 20 miles, for a week after surgery. And I don't have any data to suggest that is safe, it just helps me sleep a little bit better.

With regards to resident participation, there exists in my opinion very little in terms of technical training between a lap chole which may be a 3 or a 4, however you want to put it on a scale of 10, and a gastric bypass. You have some Nissens and you have some adrenals, but handling bowel and sewing bowel is different, and so requires a significant investment on the residents' part for them to master the operation. So in the beginning I let them do more than I let them do now when they are inexperienced, because I have learned that these patients don't tolerate complications well. The procedure is so common in the hospital it overwhelms the surgical residents. So we do have physician assistants that scrub with us on busier days.

The time it takes to do a case with a resident is usually doubled. So we really have to focus on teaching that day. And it is completely dependent on the skill of the resident. It is like any operation, there are some second-year residents that pick up laparoscopy and are able to do this operation and there are some chief residents that will never be able to. So we try to individualize it and we have a skill station that they can use between cases.

But the primary focus of our teaching during the case is not bariatric surgery and is not a gastric bypass with the residents, it is how to safely handle bowel and to sew and to tie—and if they can learn that by the time they are finished, then they have really added something to their armamentarium and they can use that regardless of what area of general surgery they go into. So that is really what we focus on.

DR. J. PATRICK O'LEARY (NEW ORLEANS, LOUISIANA): What an incredible series. I am just in awe of you and your people. Having said that, can you talk to me about the pathophysiology of 1 of your variables, the use of steroids? How does that prevent nausea? Number two, one of the variables was surgeons. What kind of remediation did you put together for your surgeon who was less ideal in his performance of these procedures?

DR. TODD M. McCARTY (DALLAS, TEXAS): With regards to the surgeon, what that reflected was, in my opinion, part of

that was the amount of the procedure the resident was doing. And again, that was not predictive of complication rate and that was not predictive of mortality. That was predictive of 23-hour discharge. The longer the case, the more anesthetic, especially in these patients, the longer the recovery. So I think it reflected longer OR times, which I think we have demonstrated.

Second to that is that—you have been at Baylor and you know kind of how it works—the residents round on the patients usually in the morning and talk to the attendings. I can tell you that if you go up and round on these patients at 4:00 in the afternoon, they don't want to go home. They don't want to mess with the traffic. They want to just spend another night and go home in the morning.

So the remediation was, please round in the morning and see the patients, and if they want to go home, let them go home. And that really changed it overnight. So it was recognition of the resident involvement, and also recognizing that it was okay to send the patients home.

And the question of the pathophysiology of steroids. Organic chemistry comes to mind. The exact physiology of it, I can't tell you. But I can tell you that the idea came from general surgery literature, in which there is a lot of data published on the use of steroids as an antiemetic in surgery. The impetus for doing that was when we switched from a retrocolic Roux limb to an anticolcic Roux limb there is a little more tension on the anticolcic limb and we saw a slightly higher rate of postoperative nausea and the 23-hour discharges drop just a little bit.

Because of the database in general surgery, we used an 8 milligram Decadron bolus intraoperatively. The cases usually last 30 to 45 minutes, so they get it on induction. I have been impressed with its antiemetic effect. I would say that is 1 of the things that surgeons visit and they look at the clinical protocol that it is very easy to integrate.

DR. EDWARD H. LIVINGSTON (DALLAS, TEXAS): The movement of patients from the inpatient to the outpatient arena transfers a burden of the care more to the surgeon than from the hospital. In some instances such as Medicare, reimbursements to the hospital are much greater than they are for the professional services that surgeons collect. This creates an imbalance in terms of resource allocation, with more of a commitment from the surgeon and his team, who are receiving less money than the hospital.

Bariatric surgical patients are notorious for the amount of phone calls they generate. My question to you is: Who pays for this? I am sure your office gets an enormous number of phone calls from these patients treated as outpatients. My question is: What kind of support do you get from your hospital to deal with that?

DR. TODD M. McCARTY (DALLAS, TEXAS): Excellent question. And it is costly for the demand that the patients can

place. The truth is that there is enough preoperative education and interaction with patients managing expectations that there really are surprisingly few postoperative calls.

That being said, we have an integrated program in which some of the employees of our clinic are employed through the hospital, although the clinical component, meaning the surgeons and our physician assistant in the clinic, as well as a psychologist, are employed through our private practice. So we do have some of those costs that we absorb and some of those costs that the hospital absorbs.

The most effective approach that I think we took that really helped to manage that, and it didn't cost anything, was starting a web site, an online web site. It is moderated by 5 individuals, including the surgeons. There are about 2000 to 3000 posts on that site a month. So if a patient has a question, they can go to that site, and if it is not a medical emergency, they can post it and they have literally 1500 other patients who will answer the same question that has been answered a number of times through our office, whether it is a particular pain from an incision or a little bit of nausea. It is moderated so that we approve the posts before they go through in that we can identify any potential medical problems that are coming up.

But I can tell you the month that we started that and integrated, it dropped the number of phone calls to the practice and to the center by 90%. So it decompressed 1500 phone calls a month that went into the web site that were just routine phone calls that didn't require a physician or a physician assistant to answer, they could be answered just by somebody knowledgeable who had been through the surgery.

DR. NICOLE S. GIBRAN (SEATTLE, WASHINGTON): With such an impressive number of patients, I am wondering whether or not you have looked at the number of people that have returned for secondary panniculectomies. And I am wondering about the financials for your bariatric program. Does that include the cost of caring for patients who come back for panniculectomies?

DR. TODD M. McCARTY (DALLAS, TEXAS): No, it doesn't. There is no downstream revenue considered. That is straight reimbursement from the procedure. The downstream revenue from the procedure is very difficult to quantify, we found. So none of that is included.

About 50% of our patients will go on to some kind of plastic surgery reconstruction. Most commonly that is an abdominoplasty. That is not always done at the facility; that can be done at outpatient facilities the plastic surgeons have ownership in. So they are not always done at the hospital.

The reason for the dramatic change in the reimbursement to the hospital as it changed to outpatient is the contracts that the hospital held for a per diem reimbursement for inpatient care, which average about \$2200, and \$1000 a day

that the patients would stay. So it is about \$2200 a patient when we do it inpatient. It is a percentage of bill charges when it is performed as an outpatient.

And I don't want to focus too much on that because that wasn't the goal when we were doing this for clinical care. However, the program was losing money and we did search

for ways to help support it economically. And that change with the hospital recognizing it and then immediately and appropriately precertifying and predetermining them as an outpatient really helped to change the reimbursement pattern markedly and increase their revenues and has helped to build a strong foundation for the program.